

French Modals and Perfective: A Case of Aspectual Coercion

Vincent Homer

University of California, Los Angeles – ENS-DEC, Paris

1. Introduction

A number of researchers, in particular Bhatt (1999) and Hacquard (2006, 2009), have observed that in languages which distinguish the perfective and the imperfective aspects morphologically, whenever an ability or a circumstantial modal appears in the perfective in a positive matrix clause, it is possible to infer the truth of its complement in the actual world. I will only talk about one such language, namely French. Sentence (1a) features present perfect morphology; in the indicative mood, this morphology correlates with the perfective aspect. The sentence not only says that at a past interval Olga had the capacity to lift a fridge, it also entails that she did: it is infelicitous to contradict this inference, called an Actuality Entailment (henceforth AE), as in (1b), the continuation of the sentence:

- (1) a. Olga a pu_{abil} soulever un frigo. b. #Mais elle ne l' a pas fait.
Olga has can-PP lift a fridge but she NEG it has NEG done
'Olga had the capacity to lift a fridge. But she didn't do so.'

In addition to the contradiction test, I propose a new test, which consists in enforcing the actuality of the complement in order to satisfy the presupposition triggered by *aussi* 'too' in the continuation:

- (2) Olga a pu_{abil} soulever un frigo, et Marie_F aussi en a soulevé un.
Olga has can-PP lift a fridge and Marie_F too of-it has lifted one
'Olga had the capacity to lift a fridge, and Marie_F lifted one too.'

To ascertain that the first conjunct of (2) triggers an AE rather than a scalar implicature (SI), I place it in a DE environment, which blocks SIs, e.g. under *si* 'if': the presupposition of *aussi* is still satisfied, a fact compatible with the inference being an entailment (cf. (3b)).

- (3) a. Si Olga a pu_{abil} soulever un frigo, Marie_F aussi en a soulevé un. (If Olga has can-PP...)
b. If Olga lives in Paris, Marie_F lives in France too.

Generalizing, AEs can occur with all root modals, including deontic ones (this fact is seldom acknowledged), as shown by (4):

- (4) #Avec l' autorisation de son nutritionniste, Olga a pu_{deon}
with the authorization of her dietician Olga has can-PP
manger des pommes de terre, mais ne l' a pas fait.
eat of-the potatoes but NEG it has NEG done
'Authorized by her dietician, Olga was allowed to eat potatoes, but she didn't do so.'

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With the imperfective aspect (which correlates with simple past morphology, aka *imparfait*), AEs are not possible, as shown by the contradiction test (5a) and the presupposition test (5b) (the # sign in the latter indicates a presupposition failure):

- (5) a. Olga pouvait_{abil} soulever un frigo, mais ne l'a pas fait. (Olga can-PST lift a fridge, but NEG it has NEG done)
 b. #Si Olga pouvait_{abil} soulever un frigo, Marie_F aussi en a soulevé un. (If Olga can-PST lift a fridge, Mary too of-it has lifted one)

Under what conditions are AEs triggered? Previous researchers, especially Hacquard (2006), have proposed that AEs are triggered if and only if a root modal appears in the perfective (in a positive matrix clause). The main goal of this paper is to show that this criterion is not warranted, for it is both too strong (AEs occur even when the predicate is not a modal) and too weak (the perfective doesn't suffice). Focusing for the time being on its excessive weakness, the standard criterion faces an immediate problem: AEs are not always mandatory under the perfective. It is possible, under certain conditions, to deny that the complement of the modal is true in the actual world, as Mari & Martin (2009) were first to show (they propose an explanation to AEs which, like the one defended here, relies on a clash between the perfective and the stativity of root modals). Quantificational temporal modifiers, e.g. *une fois* 'once', *toujours* 'always', *souvent* 'often', *chaque fois* 'each time' (both in its restrictor and nuclear scope) are responsible for a subclass of exceptions to obligatory AEs. For example, the only difference between (6a) and (1) is the presence in the former of the modifier *à plusieurs reprises* 'on several occasions'. Locational temporal adverbials such as *cet après-midi* 'this afternoon' do not have the same effect (6b).

- (6) a. À plusieurs reprises, Olga a pu_{abil} soulever un frigo, mais ne l'a pas fait.
 b. #Cet après-midi, Olga a pu_{abil} soulever un frigo, mais ne l'a pas fait.

AEs should be impervious to temporal modification if the presence of a root modal under the perfective were a sufficient condition for them (assuming that aspect is preserved under temporal modification). Therefore examples like (6a) are genuine counterexamples to any theory that relies on the aforementioned criterion. Now, if the perfective is not sufficient, something else must come into play: I therefore submit that AEs result from some enrichment of the meaning of modalized sentences in the perfective. In order to capture the nature of the process, I propose that we look for a meaning-enrichment mechanism that applies specifically in the perfective. Aspectual coercion just fits the bill: it enriches the meaning of sentences where the perfective, in contravention of its need for a bounded predicate, is confronted with a stative one; this paper shows that AEs are the result of a certain kind of aspectual coercion, which I name actualistic.

Section 2 explains some key notions and argues that root modals form stative predicates. Section 3 shows how coercion applies uniformly to modal and non-modal predicates and presents AEs as instances of a hitherto undocumented kind of aspectual coercion, the actualistic one. Section 4 compares this approach to Hacquard's (2006).

2. Background

2.1. Aspectual classes

This paper deals with the interaction between Viewpoint aspect and aspectual class, specifically between the perfective and stative predicates of eventualities. Predicates of eventualities (denoted by vPs) can be either bounded, stative or neither. I assume that the domain of eventualities D_v has a semi-lattice structure that is partially ordered by the part relation ' \sqsubseteq ': ' \sqsubseteq ': $\forall e, e' \in D_v$ [$e \sqsubseteq e' \leftrightarrow e \oplus e' = e'$]. The proper part relation is defined as follows: $\forall e, e' \in D_v$ [$e \sqsubset e' \leftrightarrow [e \sqsubseteq e' \wedge e \neq e']$]. Bounded predicates, e.g. *John bake the cake*, apply to eventualities that have no proper parts homogeneous to the whole (i.e. no proper part of an eventuality of John baking the cake is itself an eventuality of John baking the cake).

Stative predicates, e.g. *John be in the pub*, apply to eventualities that have proper parts, each of which is homogenous to the whole. Let P be a predicate of eventualities:

- (7) P is bounded iff $\forall e, e'$ if $P(e) \wedge e' \sqsubset e$ then $\neg P(e')$;
 P is stative iff $\forall e$ if $P(e)$ then (i) $\exists e'[e' \sqsubset e]$ and (ii) $\forall e''$ if $e'' \sqsubset e$ then $P(e'')$.

2.2. Viewpoint aspect

I assume that Viewpoint aspect (either perfective, PFV, or imperfective, IMPFV) is a head located below T (and perfect, PERF, when it is projected as in the present perfect) and above vP. It takes a predicate of eventualities of type $\langle v, t \rangle$ and a time interval (the topic time) of type $\langle i \rangle$, and locates the temporal trace of some eventuality in the denotation of the predicate w.r.t. the topic interval. PFV includes the runtime of an eventuality within the topic interval (the τ function maps eventualities onto their runtimes); PERF introduces the topic interval.¹

- (8) a. $[[PFV]]^{c,s} = \lambda P_{vt}. \lambda t_i. \exists e_v[\tau(e) \sqsubseteq t \wedge P(e)]$ b. $[[IMPFV]]^{c,s} = \lambda P_{vt}. \lambda t_i. \exists e_v[t \sqsubseteq \tau(e) \wedge P(e)]$
 c. $[[PERF]]^{c,s} = \lambda p_{it}. \lambda t_i. \exists t'_i[t' \leq t \wedge p(t')]$ ($t' \leq t$ iff there is no $t'' \sqsubset t'$, s.t. $t'' > t$)
 d. $[[PRES]]^{c,s} = \lambda p_{it}. \lambda t_i. t = t_c \wedge p(t)$
 e. Il a plu. (it has rained) f. LF: $[\lambda w_1 [_{TP} PRES [_{PERFP} PERF [_{VAspP} PFV [_{vP} w_1 pleuvoir]]]]]$
 g. $[[(8f)]]^{c,s}(w_c)(t_i) = \exists t_i[t \leq t_c \wedge \exists e_v[\tau(e) \sqsubseteq t \wedge e \text{ in } w_c \wedge \text{rain}(e)]]$

After de Swart (1998) and Bary (2009), I assume that a selectional restriction bears on the complement of PFV: it must be a *bounded* predicate of eventualities. The incompatibility of PFV with stative predicates is visible in the following:

- (9) a. #Tout à l'heure, il a été assis/ en colère.
 earlier he has been sitting/ angry
 b. Tout à l'heure, il était assis/ en colère.
 earlier he was sitting/ angry

This is not to say that stative predicates can never co-occur with the perfective. In fact they can, but as we will now see, this co-occurrence is always accompanied by a certain semantic enrichment, called *aspectual coercion* (de Swart 1998, Bary 2009). In and of themselves, stative predicates are, by definition, unable to meet the selectional requirement of the perfective; but they can still occur under the perfective if they contribute to forming a bounded predicate.² Operative in the process are coercion operators inserted between PFV and vP, whose function is to return bounded predicates. Section 3 is devoted to the exploration of the properties of three coercion operators; my strategy is to show for each of them that it applies in a fully parallel fashion to non-modal and to modal predicates. Of central importance in the discussion is the third operator, the one which gives rise to the entailment that an event related to the core stative predicate took place in the actual world.

2.3. Modals form stative predicates of eventualities

Before proceeding, it is important to show that root modals form (i) predicates of eventualities (ii) which are stative (the ultimate goal is to show that the enrichment process that targets statives in the perfective applies to them too). First, Viewpoint aspect selects for a predicate of eventualities P of type $\langle v, t \rangle$ (cf. (8a)). It seems safe to assume that the presence of a root modal doesn't change the type of the complement of Viewpoint aspect. Second, what kind of eventuality gets ordered w.r.t. the topic interval in the presence of a root modal? My claim is that root modals apply to states (the evaluation

¹ The lexical entries in (8a-d) are borrowed from Pancheva & von Stechow (2004); I use an extensional system with indexed abstractors over world variables which are syntactically represented, *à la* Percus (2000).

² Activities e.g. *John run*, are neither bounded nor stative; they can appear under the perfective through some coercion (interestingly, their coercion doesn't seem to ever need any temporal adverbials).

points of their accessibility relations), which are the input to the temporal ordering carried out by Viewpoint aspect. This claim is somewhat controversial, so we need to look at the facts with great care. If it is true that root modals apply to eventualities, these should have time and space coordinates, like any other eventuality. As for a time coordinate, in sentence (10) the adjunct *hier* ‘yesterday’ sets the time of John’s obligation to turn in his homework, while *la semaine prochaine* ‘next week’ sets the one of the turning-in itself. Therefore what Viewpoint aspect (IMPFV in the case at hand) orders w.r.t. the topic interval is the runtime of a legal situation (now over and superseded by a new one); it is not the runtime of an event of Pierre turning in his homework. Generalizing, eventualities in the denotation of the complement of a root modal are *never* quantified over by Viewpoint aspect.

(10) *Context*: The rules have just changed: Pierre now has to turn in his homework tomorrow.

| | | | | | | |
|-----------|---------|------------|------------------------|---------|-----|----------|
| Hier | encore, | il | devait _{deon} | rendre | son | devoir |
| yesterday | still | he | must-PST | turn-in | his | homework |
| la | semaine | prochaine. | | | | |
| the | next | week | | | | |

‘Yesterday, he still had to turn in his homework next week.’

The next sentence exemplifies a mismatch between the space coordinate of the legal situation fixed by the matrix adverbial, and the one of the eventuality of graduating.

(11) *Context*: Where he lives now, is Jean allowed to practice as a surgeon with his French degree?

| | | | | | | | | | |
|---------|---------|------------|---------------|------|----------------------|---------|-------|--------|--------|
| Non, | dans ce | pays | Jean | ne | peut _{deon} | pas | avoir | obtenu | son |
| no | in | this | country | Jean | NEG | can-PRS | NEG | have | gotten |
| diplôme | de | chirurgien | à l’étranger. | | | | | | |
| degree | of | surgeon | abroad | | | | | | |

‘No, in this country, Jean is not allowed to have gotten his surgeon degree abroad.’

Predicates formed by root modals thus apply to eventualities. I propose that root modals take a proposition (they create biclausal structures), a world and an eventuality (the same lexical entry holds, *mutatis mutandis*, for *devoir_{root}* ‘must’). The accessibility relation *Acc* takes as input an eventuality, e.g. the existence of certain conditions, rules or circumstances (I draw from situation semantics when I say that accessibility is not relative to a world but to an eventuality).

(12) a. $[[\text{pouvoir}_{\text{root}}]]^{\text{c},\text{s}} = \lambda\Phi_{\text{st}}.\lambda w_s.\lambda e_v. e \text{ in } w \wedge \exists w' \in \text{Acc}(e)[\Phi(w')]$ b. Jean peut_{deon} travailler.
 c. $[[\text{(12b)}]]^{\text{c},\text{s}} = 1$ iff at t_c there is an eventuality e in w_c such that for some world w' compatible with e , Jean works in w' .

If root modals are predicates of eventualities, they are stative, since our definition of stative predicates applies to them: any P eventuality described as the existence of certain conditions, rules or circumstances has proper parts, each of which is itself a P eventuality. There is empirical evidence that root modals do form stative predicates: I use the incompatibility of the periphrastic progressive *être en train* with stative predicates illustrated in (13b) as a test. As expected, the modal predicate *x pouvoir gagner l’élection* is infelicitous under the progressive:

| | | | | | | | | | |
|------|----|-------|-------------------|---------|-------|----------|---------|-----------|----------|
| (13) | a. | être | en | train | de | gagner | l’ | élection/ | courir |
| | | be | in-the-process-of | win-INF | the | election | run-INF | | |
| | b. | #être | en | train | d’ | être | en | colère/ | pouvoir |
| | | be | in-the-process-of | be-INF | angry | can-INF | win | the | election |

3. Aspectual coercion

3.1. Ingressive interpretation

Uttered out of the blue, (14a) is deviant for want of a bounded predicate satisfying the requirement of the perfective. The adjunction of the adverb *soudain* ‘suddenly’ in (14c) salvages the sentence:

- (14) a. #Jean a été en colère cet après-midi. (Jean has been angry this afternoon)
 b. Jean était en colère cet après-midi. (Jean was angry this afternoon)
 c. Jean a soudain été en colère cet après-midi. (Jean has suddenly been angry this afternoon) Il n'a pas cessé de l'être depuis. (he NEG has NEG stopped of it be since-then)
 'Suddenly, Jean became angry this afternoon. He has been angry nonstop ever since.'

Given the background assumptions adopted here, this means that a bounded predicate is made available in (14c) and is fed to PFV. A coercion operator generated between PFV and vP must be responsible for the transformation, and the adverb plays a role in licensing the operator.³ We can infer the workings of this operator from the particular reading that obtains: the sentence says that John *started* being angry at a time included within the topic interval denoted by *this afternoon* (and leaves open the possibility that John is still in this state at the time of utterance). To achieve this reading, Bary (2009) postulates an INGR operator, which outputs, in the case at hand, a bounded predicate of eventualities (the input to PFV) that applies to instantaneous—hence devoid of proper parts—eventualities, the initial bounds of open-ended eventualities of John being angry. I refer the reader to Bary (2009) for details. Now, the very same kind of reading comes about with modal predicates:

- (15) a. Olga a soudain pu_{abil} soulever un frigo, mais ne l'a pas fait.
 b. Si Olga a soudain pu_{abil} soulever un frigo, Marie_F aussi en a soulevé un.

Olga a soudain pu soulever un frigo can mean, as the continuation in (15a) shows, that a state of Olga being able to lift a fridge came into existence at some point: under this reading brought about by INGR (and made available e.g. in a context where a magician played a trick on Olga that made her strong instantly), the AE is not triggered. But under another reading, the AE comes about (15b). As will become clearer in section 3.4, the optionality of the AE in (15) is a case of ambiguity between two kinds of coercion, the ingressive one (15a) and the actualistic one (which yields AEs) (15b). A point needs to be emphasized: a modal predicate can be coerced, in the same way that a non-modal stative predicate can. From this it follows that modal predicates do not meet the selectional requirement of the perfective and that they in fact *must* be coerced to fit under this particular Viewpoint aspect.

3.2. Complexive interpretation

The second kind of special interpretation that arises when the perfective is confronted with a stative predicate is what Bary (2009) calls a complexive interpretation, whereby the existence of a locally maximal state is asserted. Quantificational adverbials e.g. *à plusieurs reprises* 'on several occasions', *une fois* 'once', *chaque fois* 'each time', *à un moment* 'at some point'..., as well as durational ones e.g. *pendant n heures* 'for n hours'... (as opposed to locational ones e.g. *cet après-midi* 'this afternoon') support this reading.

- (16) Il y a un moment de l'après-midi où Jean a été assis. (there is a moment of the afternoon where Jean has been sitting)

For (16) to be true, this afternoon must contain a *maximal* state of Jean sitting (i.e. a state not contained within some larger state of the same nature). After Bary (2009), I assume that an operator labeled MAX (generated between PFV and vP) performs the operation of turning a stative predicate into a maximal one. In the case at hand, boundedness is achieved through maximality: no proper part of a maximal P eventuality is itself a maximal P eventuality (see Bary 2009 for details). Here again, it is important to observe that modal predicates pattern with non-modal ones in being subject to the same

³ The exact role of adverbials in supporting certain readings cannot be explored in this paper. They don't seem to be necessary to carry out the ingressive and the complexive coercions, because certain predicates can be coerced in the perfective without temporal modification, e.g. *Pierre être prof d'anglais* 'Pierre be an English teacher', which can easily be understood as a locally maximal state (i.e. complexive interpretation).

kind of coercion. (17a) merely says that at some point in the past, there was a temporally maximal capacity:

- (17) a. Il y a un moment où/À plusieurs reprises Olga a pu_{abil} soulever un frigo, mais ne l'a pas fait.
 b. S'il y a un moment où/Si à plusieurs reprises Olga a pu_{abil} soulever un frigo, Marie_F aussi en a soulevé un.

The two continuations show again an ambiguity, this time between a complexive reading (17a) and an actualistic one (aka AE) (17b). The fact that modal predicates are amenable to at least two kinds of aspectual coercion in the perfective suffices to show that they are not suitable complements of the perfective, and that they *need* to be coerced. It is now time (i.) to show that there exists a kind of coercion which gives rise to AEs with non-modal stative predicates and (ii.) to propose that canonical AEs (with modals) are nothing but the result of this coercion.

3.3. Actualistic interpretation

Besides the ingressive and the complexive interpretations, French has a third kind of aspectual coercion of stative predicates, which has gone unnoticed so far. I propose that it is the culprit in the triggering of canonical AEs. When placed in the scope of PFV, a number of stative predicates (importantly, not all predicates are eligible) give rise to a reading whereby the existence of some pragmatically determined event is entailed. This is true e.g. of predicates formed with the verb *coûter* 'cost': (18a) not only says what the price of the house was, it also entails that the house was bought for that price. No such entailment occurs if we substitute the *imparfait* (hence imperfective aspect) for the present perfect (which correlates with the perfective aspect), as in (18b):

- (18) a. La maison a coûté 100 000 € (the house has cost €100,000). → The house was bought.
 b. La maison coûtait 100 000 € (the house cost-PST €100,000). → The house was bought.

Similarly with the following stative predicates (the entailment doesn't obtain in the imperfective, but for reasons of space, I only present perfective sentences and their entailment):

- (19) a. L'obstacle a été facile/ difficile/ presque impossible à franchir. (the obstacle has been easy/
 difficult/ almost impossible to overcome) → The obstacle was overcome.
 b. Jean a eu du tact. (Jean has had tact) → Jean acted tactfully.
 c. Jean a été intelligent. (Jean has been intelligent) → Jean did something intelligent.

The fact that these entailments only occur in the perfective strongly suggests that they result from aspectual coercion. I call the operator at play ACT. The bounded predicate of eventualities it returns is pragmatically determined; for example in (18a), the output predicate applies to events of someone buying the house and in (20b) to events of Jane taking the train (the value of $s(Q_2)$ below). This means that the second predicate argument of ACT is, in the object language, a free variable, whose value is set by the context. The third conjunct in the meaning of ACT says that it is bounded; the fourth conjunct ensures that the runtime of the event is simultaneous with the runtime of some eventuality in the denotation of the core stative predicate (for want of space, I won't justify this clause here).

- (20) a. $[[ACT]]^{e,s} = \lambda P_{vt}. \lambda Q_{vt}. \lambda w_s. \lambda e_v. Q(e) \wedge e \text{ in } w \wedge \forall e'_v [e' \sqsupset e \rightarrow \neg Q(e')] \wedge \exists e''_v [P(e'') \wedge \tau(e) = \tau(e'')]$
 b. Jane a pu_{circ} prendre le train.
 c. LF of (20b): $[\lambda w_1 [_{TP} PRES [_{PERFP} PERF [_{VAspP} PFV [w_1 Q_2 ACT [_{VP} w_1 pouvoir [_{CP} \lambda w_3 [w_3 J. prendre-le-train]]]]]]]]]$
 d. $[[[20c]]^{f,s}(w_c)(t_1) = 1 \text{ iff there is a past interval } t \text{ s.t. there is an eventuality } e \text{ of } s(Q_2) \text{ in } t \text{ in } w_c \text{ s.t. no proper part of } e \text{ is an eventuality of } s(Q_2), \text{ and } e \text{ is simultaneous with a state in } w_c \text{ of } J. \text{ taking the train being possible.}]]]$

The effect of ACT matches the description of AEs. Given that modal predicates are in fact *always* coerced in the perfective, I propose that AEs with root modals in (1), (3a), (6b), (15b) and (17b) are mere instances of the actualistic coercion.

3.4. Summary

All stative predicates need to be coerced in the perfective. Temporal adverbials support certain types of coercion. For the predicates that are amenable to the actualistic one, temporal modifiers are not necessary to get the interpretation: therefore in the presence of temporal modifiers, ambiguity ensues, and in their absence, only the actualistic interpretation is available. As for predicates that are not amenable to the actualistic interpretation, the only way they can be made acceptable in the perfective is through the ingressive and the complexive interpretations, supported by the appropriate modifiers (they are otherwise generally excluded cf. (9a)).

| Modification → Predicates ↓ | No modifier | ‘Soudain’ | Quantificational modifiers |
|---|--------------------------|--|---|
| <i>John be angry,</i> <i>John be sitting</i> | No coercion | Ingr ^{ve} (no AE) | Compl ^{ve} (no AE) |
| <i>John can p, John must p,</i> <i>the house cost n,</i> <i>m be difficult to p</i> | Act ^{stic} (AE) | Ingr ^{ve} (no AE) or Act ^{stic} (AE) | Compl ^{ve} (no AE) or Act ^{stic} (AE) |

Table: Stative Predicates and their Coercion Potentials

4. Comparison with Hacquard (2006)

Hacquard (2006) focuses on examples with ability and circumstantial modals (primarily existential), without any adverbial modifiers. She thus doesn’t discuss any exceptions to AEs, such as (6a), (15a) and (17a). But these exceptions are genuine counterexamples to her analysis.

The thrust of the proposal lies in what Hacquard takes to be a syntactic peculiarity of modal verbs: *pouvoir* and *devoir*, unlike other modal expressions e.g. *avoir la possibilité de*, are, according to this proposal, auxiliaries. When it comes to AEs, this purported difference is *prima facie* illuminating: in the absence of temporal modifiers, negating the actuality of the complement of the former leads to a contradiction, as we already know (1); but the same test applies to the latter without a hitch:

- (21) Olga a eu la possibilité_{circ} de prendre le train de 7 heures, mais ne l’a pas fait.
‘Olga had the possibility to take the 7 o’clock train but she didn’t do so.’

Hacquard concludes that modal verbs are special among modal expressions, and among verbs *tout court*: they are auxiliaries (in ModP), and as such lack an argument that, in her account, all lexical verbs have, namely Aspect. Here the proposal departs from the orthodox view (held here and in many studies on tense and aspect) that Aspect is a projection intermediate between Tense and vP: Aspect in Hacquard’s view is generated as an argument (of type $\langle\langle s, i, vt \rangle, t \rangle$) of lexical verbs, but a type mismatch forces it to raise right below Tense, leaving behind a trace $\langle v \rangle$. When a root modal verb (a quantifier over accessible worlds) is present, the raised Aspect argument ends up taking scope over it. Next, Aspect is a generalized quantifier over eventualities; as a result of moving out of its base position, it binds its trace of type $\langle v \rangle$ in the nuclear scope of the modal (this amounts to quantifying in); it also takes a world argument bound by the matrix default world binder λw_1 .

- (22) a. $[[PFV]]^{e,s} = \lambda w_s. \lambda t_i. \lambda P_{vt}. \exists e_v [e \text{ in } w \wedge \tau(e) \subseteq t \wedge P(e)]$
 b. $[[pouvoir_{root}]]^{e,s} = \lambda \Phi_{st}. \lambda w_s. \exists w'_s \in \text{Acc}(w) [\Phi(w')]$
 c. Jane a pu_{circ} prendre le train.
 d. LF of (22c): $[\lambda w_1 [_{TP} T [PFV w_1] [2 [_{ModP} pouvoir \lambda w_3 [_{vP} w_3 \text{ Jane prendre-le-train } t_{2(v)}]]]]]$
 e. $[[[(22d)]]^{e,s} (w_c) = \exists e_v [e \text{ in } w_c \wedge \tau(e) \subseteq t \{t < t_c\} \wedge \exists w'_s \in \text{Acc}(w_c) [\text{take-the-train}(w', e) \wedge \text{Ag}(e, J)]]]$

‘There is an event in w_c located in a past interval, and there is a world compatible with Jane’s abilities in w_c where that event is a taking-the-train event by Jane.’

In this configuration, Aspect asserts the existence of some eventuality in the actual world, and with an existential quantification over possible worlds mediating between Aspect and vP (i.e. the modal), this eventuality is said to be, in some accessible world, in the denotation of the predicate denoted by vP . Hacquard claims that the properties of an eventuality e in an accessible world are the same as the properties of e in the actual world, which derives that in (22c) an eventuality of Jane taking the train took place in actuality.

(23) Principle of Event Identification across Worlds (Hacquard 2006):⁴

For any w_1, w_2 : If an eventuality e occurs in w_1 and w_2 , and e is described as a P eventuality in w_1 , then e is a P eventuality in w_2 .

I now point out three shortcomings of this account. First, there is no compelling reason to treat French root modal verbs as auxiliaries. As a matter of fact, Hacquard does not define the notion of auxiliary, and after all it is not even clear that it corresponds to any natural class. It is commonly thought that English so-called true modals (e.g. *must* and *can*) are auxiliaries by virtue of their participation to V-to-T movement (evidenced by the linearization of *not* after them). In French tensed clauses, this property is shared by all verbs, and cannot be used as a criterion; in infinitive clauses, where Pollock (1989) shows that V-to-T discriminates among verbs, head movement of root modals is very marginal (24a), unlike that of the auxiliaries *être* ‘be’ and *avoir* ‘have’ (24b), suggesting that the former are not auxiliaries.

(24) a. ??ne pouvoir pas parler/ ??ne devoir pas parler (NEG can/must-INF NEG speak)

b. n’ avoir pas parlé (NEG have-INF NEG spoken)

c. *ne parler pas (NEG speak-INF NEG)

Second, we have seen that root modals are unlikely to be mere quantifiers over worlds, *pace* Hacquard (compare (12a) and (22b)). In subsection 2.3, I proposed that root modals, as predicates of eventualities, apply to states located in space and time (the evaluation points of root accessibility relations). Now if this claim is correct, the quantifying-in approach loses its bite: in sentences with a root modal, Aspect really quantifies over eventualities that the modal or the output of a coercion operator (in the perfective) applies to; it doesn’t quantify over eventualities in the set denoted by the vP in the scope of the modal. In other words, Aspect always selects for a complement of type $\langle vt \rangle$ and quantifies over eventualities in its denotation, which it locates w.r.t. the topic interval. If quantifying-in were taking place, Aspect would locate w.r.t. the topic interval eventualities occurring in the worlds quantified-over by the modal; yet this cannot be true, for the temporal location of those eventualities is set independently of matrix Aspect, cf. (10).

Third, the claim that AEs only occur with root modal verbs (the so-called auxiliaries) is falsified twice. 1. It is not the case that periphrastic modal expressions are unable to trigger AEs in the perfective. Granted, (21) shows that a contradicting continuation can be used with *avoir la possibilité de*, without creating any semantic deviance. Yet it is imprudent to conclude from this that *no* sentence pronounced *Olga a eu la possibilité de prendre le train de 7 heures* triggers an AE. Such a string is in fact ambiguous: under one reading, it does not yield an AE (21), but under another one, it does, as illustrated in (25), where the perfectly felicitous use of the presupposition trigger *aussi* ‘too’ reveals that it is part of the common ground when the continuation is uttered that Olga did take the 7 o’clock train.

⁴ For our current purposes, it is sufficient to quote, as I do, a provisional version of the principle, glossing over the final version. In either version, the principle rests on the questionable assumption that an event necessarily keeps the same properties across worlds, which seems implausible in view of the existence of counterfactuals, as noted by Hacquard herself (Hacquard 2009). Since the facts that I’m presenting here are by and large foreign to this aspect of Hacquard’s theory, I will leave this discussion here.

- (25) Si Olga a eu/#avait la possibilité_{circ} de prendre le train de 7 heures, Marie_F aussi l'a pris.
 'If Olga had the possibility to take the 7 o'clock train, Marie_F took it too.'

In light of the principles I advocate in this paper, the reason no AE is triggered in (21) is either that no aspectual coercion occurs, or that a kind of coercion other than the actualistic one is available (without adverbial modification). The first option is certainly viable, since the verb *avoir* 'have', which is part of the modal expression, has some eventive usages, e.g. in (26), where it means *get* in the absence of any aspectual coercion (the sentence is in the simple indicative present).

- (26) On a son bac à 18 ans. (one have-PRS his A-levels at 18 years)
 'One gets their A-levels at the age of 18.'

2. AEs are not in fact restricted to modal expressions *sensu lato*, as became apparent in section 3.3. Hacquard acknowledges the existence of an actuality inference in (18a), cf. her example (9a); but she claims that this inference is the result of a pragmatic reasoning which goes as follows: the sentence says that there was a past interval at which the cost of the house was €100,000. The hearer reasons that if this state is now over, it is because some event put an end to it, and the most plausible event capable of terminating such a state is a monetary transaction. Notice that this account makes no reference to the perfective, only to the fact that the state is at the time of utterance (i.) past and (ii.) completed. But these two characteristics do not suffice to yield the transaction inference: we can very well concoct an imperfective sentence and ensure that the denoted state features the two characteristics, yet the inference does not obtain:

- (27) La maison coûtait 100 000 € jusqu'en 1980 mais pas au delà. (the house cost-PST €100,000 until 1980 but not afterwards) → The house was bought.

5. Conclusion

This paper argues that AEs, traditionally described as caused by the presence of a root modal under the perfective, are instances of a kind of aspectual coercion, which I label actualistic. Stative predicates of eventualities are not per se suitable complements of the perfective, and their meaning needs to be enriched by means of a syntactically represented operator. I show that root modal predicates are stative, therefore whenever they appear under the perfective, they are coerced. The observation that some non-modal stative predicates in the perfective give rise to the inference that an event took place provides evidence that AEs with root modals are indeed the outcomes of aspectual coercion.

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Katherine McKinney-Bock, Erika Varis,
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